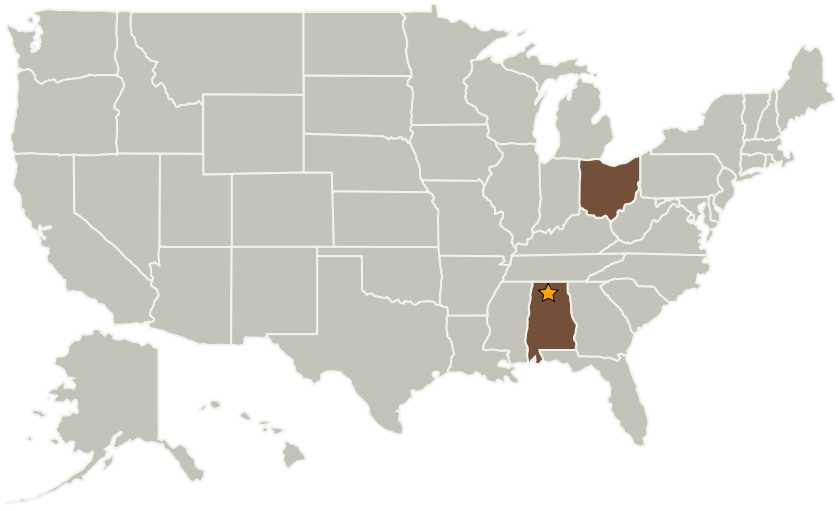
Low Mass Aeroshell Deployment Mechanism, Phase I

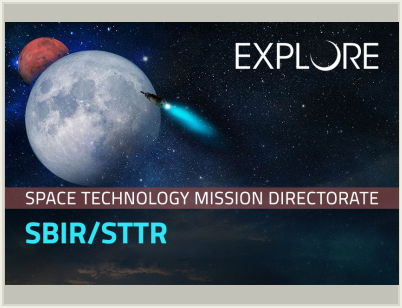
Completed Technology Project (2007 - 2007)

Project Introduction

Cornerstone Research Group Inc. (CRG) will develop new shape memory polymer (SMP) deployment mechanisms for actuating thermal protective systems (TPS) panels to create a deployable large surface area aeroshell. This innovation will utilize VeriflexTM -- CRG's high performance SMP material -- to create a low mass actuation system for a deployable the aeroshell design. VeriflexTM-based mechanisms will deploy the aeroshell without the use of motors, springs, or mechanical controls. These simple, self-deploying, self-aligning mechanisms will reduce the mass and the complexity of the aeroshell design. VeriflexTM-based deployment mechanisms will allow the use of panels made from existing TPS materials to create a large surface area aeroshells that will stow in a highly compact pre-launch and storage configuration and then self-deploy before reentry to the operational configuration. The TPS panels will deploy outward and increase the diameter of the aeroshell. For every 10 percent increase in the diameter, there will be a 21 percent increase in the total surface area of the aeroshell. The relative volume of space needed to stow the reentry vehicle would not increase.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Cornerstone Research Group, Inc.	Supporting Organization	Industry	Miamisburg, Ohio

Primary U.S. Work Locations	
Alabama	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.3 Mechanical Systems
    - TX12.3.1 Deployables, Docking, and Interfaces